

Claims

1. A method for producing a lightweight starting stock for impact extrusion or impact forging comprising the following sequence:
 - a) mixing alloying elements into aluminum with the alloy composition containing 5.0 to 12.0 wt% Zn, 1.0 to 3.5 wt% Mg, 0 to 2.8 wt% Cu and 0.02 to 1.0 wt% of at least one grain refining element selected from the group consisting of Zr, Sc, Zr, Mn, Ti, Hf and other dispersoid forming elements and casting said alloying elements to produce a billet,
 - b) extruding said billet to provide and extruded starting stock for impact extrusion,
 - c) annealing said starting stock to provide annealed starting stock for impact extrusion
 - d) impact extruding said starting stock into an impact extruded component,
 - e) solution heat treating and quenching said impact extruded component and
 - f) aging said impact extruded component wherein said impact extruded component has a yield strength of at least 85 ksi.
2. The method of claim 1 wherein said impact extruded component has a yield strength of >90 ksi.
3. The method of claim 1 wherein the action of impact extruding is conducted in multiple steps with intermediate annealing provided after each impact extrusion to soften the alloy for the subsequent impact extrusion.
4. The method of claim 1 wherein the billet is homogenized prior to extrusion.
5. The method of claim 1 wherein machining operations are introduced to advantageously shape the impact extrusion starting stock for initial impact extrusions or to shape the impact extrusion stock during the repeated impact extrusion steps.
6. A method for producing a lightweight starting stock for impact extrusion or impact forging comprising the following sequence:
 - a) mixing alloying elements into aluminum with the alloy composition containing 5.0 to 9.0 wt% Zn, 1.0 to 3.5 wt% Mg, 0 to 1.9 wt% Cu and 0.02 to 1.0 wt% of at least one grain refining element selected from the group consisting of Zr, Sc, Zr, Mn, Ti, Hf and other dispersoid forming elements and casting said alloying elements to produce a billet,
 - b) extruding said billet to provide and extruded starting stock for impact extrusion,

- c) annealing said starting stock to provide annealed starting stock for impact extrusion
 - d) impact extruding said starting stock into an impact extruded component,
 - e) solution heat treating and quenching said impact extruded component and
 - f) aging said impact extruded component wherein said impact extruded component has a yield strength of at least 85 ksi.
7. The method of claim 6 wherein said impact extruded component has a yield strength of >90 ksi.
8. The method of claim 6 wherein the action of impact extruding is conducted in multiple steps with intermediate annealing provided after each impact extrusion to soften the alloy for the subsequent impact extrusion.
9. The method of claim 6 wherein the billet is homogenized prior to extrusion.
10. The method of claim 6 wherein machining operations are introduced to advantageously shape the impact extrusion starting stock for initial impact extrusions or to shape the impact extrusion stock during the repeated impact extrusion steps.
11. A method for producing a lightweight starting stock for impact extrusion or impact forging comprising the following sequence:
- a) mixing alloying elements into aluminum with the alloy composition containing 8.4 to 12.0 wt% Zn, 1.0 to 3.5 wt% Mg, 0 to 2.8 wt% Cu and 0.02 to 1.0 wt% of at least one grain refining element selected from the group consisting of Zr, Sc, Zr, Mn, Ti, Hf and other dispersoid forming elements and casting said alloying elements to produce a billet,
 - b) extruding said billet to provide an extruded starting stock for impact extrusion,
 - c) annealing said starting stock to provide annealed starting stock for impact extrusion
 - d) impact extruding said starting stock into an impact extruded component,
 - e) solution heat treating and quenching said impact extruded component and
 - f) aging said impact extruded component wherein said impact extruded component has a yield strength of at least 85 ksi.
12. The method of claim 11 wherein said impact extruded component has a yield strength of >90 ksi.

13. The method of claim 11 wherein the action of impact extruding is conducted in multiple steps with intermediate annealing provided after each impact extrusion to soften the alloy for the subsequent impact extrusion.

14. The method of claim 11 wherein the billet is homogenized prior to extrusion.

15. The method of claim 11 wherein machining operations are introduced to advantageously shape the impact extrusion starting stock for initial impact extrusions or to shape the impact extrusion stock during the repeated impact extrusion steps.